

ABSTRACT OF THE DISCLOSURE

A rotary position sensor employs an offset beam forming optical element such as a tilted mirror or a diffraction grating. The axis of the light beam from a source can be parallel to the rotational axis or tilted at a predetermined angle. One or multiple spots of light from reflected/diffracted beam(s) are located on a generally elliptical path on an array of detectors. A detector that is photosensitive only along the elliptical path may be employed, the detector being divided into multiple regions to enable a processor to identify the azimuthal angle of the spot. When a diffraction grating is employed, return beams corresponding to positive first and negative first diffracted orders are generated, and these are displaced substantially symmetrically with respect to the axis of the source. The use of multiple beams can reduce sensitivity to mis-alignment errors. Some aspect of one or more of the beams, such as optical intensity or radial displacement, can be made unique to enable the processor to identify the angular position modulo 360 degrees.

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